## REMARKS

After the foregoing amendment, claims 2-3 and 5-6, as amended, are pending in the application. Claims 1, 4 and 7-10 have been canceled. Claims 2-3 and 5-6 have been amended to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants submit that no new matter has been added to the application by the Amendment.

## Yang et al.

Yang et al. is directed to a self-routing multicast network, based on binary radix sorting, which can realize arbitrary assignments between its inputs and its outputs. (Abstract). As taught by Yang et al., the output ports of the network to which each packet, input to an input port, is to be connected is characterized by a set of output addresses called a *destination set*. (See page 1300, section 2). Yang et al. further characterizes each input packet by a routing tag. Yang et al. states that the routing tag has four values, "0" (0 bound), "1" (1 bound), $\alpha$ (bicast) and $\varepsilon$ (idle) corresponding to cases 1-4 (described below). According to Yang et al., the <u>value</u> of the routing tag (i.e in-band control signal) for each packet at the input to the ith stage (level) of the network is determined by the ith most significant bit of the destination set.

However, as explained in Yang et als.' paper, the routing tag $\{0, 1, \alpha, \varepsilon\}$determines only whether the packet is directed to an upper half or a lower half of a stage in the network and does not (except for the final stage) determine which specific port the packet is directed to. Further, as explained by Yang et al, the routing tag $\{0, 1, \alpha, \varepsilon\}$ by itself is unsuitable for use as an in-band control signal when multicasting is required in a network constructed of a reverse banyan network. Consequently, in Yang et als. invention, the routing tag $\{0, 1, \alpha, \varepsilon\}$is modified to the form $\{0, 1, \alpha, \varepsilon_0 s, \varepsilon_1 s\}$to facilitate multicasting.

As described at page 1300, section 2, the multicast network consists of a recursive construction of a binary splitting network (BSN) followed by two n/2 binary radix sorting multicast networks (BRSMN) linked to the upper half and the lower half of the outputs of the BSN. The function of each BSN is to split each multicast connection on each of the BSN input ports to either the upper half or the lower half of the BSN output ports based on whether each destination address specified in the destination set belongs the upper half of the BSN output ports or the lower half of the BSN output ports. By continuously reducing each BRSMN to a BSN

followed by two BRSMNs, the final BRSMN is merely a 2X2 switch capable of realizing a multicast or a unicast connection. The legal operations for a 2X2 switch capable of performing both bicast and unicast switching are described in Fig. 3.

As stated by the inventors, the problem of constructing the multicast network resolves into designing the BSN network.

Yang et al. first defines a set of rules (cases 1-4 see page 1300, col. 2) for switching an input to a BSN to an output of the BSN based on the destination set (i.e. output addresses) characterizing each input packet. Yang et al. then teaches that the BSN network can be made of a scatter network cascaded with a quasi-sorting network. The scatter network partially implements the aforementioned set of rules such that each multicast input which has destination addresses in both the upper half and the lower half of the BSN output ($\alpha$ signals) are split into signals conforming to either case 1 ("0" signals) or case 2 ("1" signals) but are <u>not</u> sorted. The quasi-sorting network then transfers all the "0"s output by the scatter network to the upper half of the BSN network outputs and the "1"s to the lower half of the BSN network outputs.

Yang et al. then describe how to implement the scatter network and the quasi-sorting network for each BSN using a reverse banyan network (RBN). In particular at page 1302, section 4, Yang et al. propose that the quasi-sorting network be based on "Theorem 1" (page 1302, section 4, col. 2, lines 45-48). After extensive analysis, Yang et al. conclude at page 1306, section 5.2, first paragraph that Theorem 1 can be applied to the type of sorting required in the quasi-sorting network "only for full permutation assignments, in which each input of the RBN has a tag value of 0 or 1, and <u>cannot be directly applied to partial permutation or multicast assignments.</u>"

Yang et al. solve this problem by requiring that idle packets be characterized as either 0 bound ($\varepsilon_0$s) or 1 bound ($\varepsilon_1$s). Because of the characterization of idle packets into two types, the number of connection states for a switch increases from four to five. Consequently, at page 1311, section 7.2, second paragraph, Yang et al. states explicitly that "three bits are required to represent a routing tag value" of the in-band control signal at each stage in the BSN network in order for the network to perform multicasting and <u>teaches the encoding scheme for generating the tag values at Table 1 on page 1306, second column</u>.

**Claim Rejections – 35 U.S.C. § 102**

The Examiner has rejected claims 2, 3 and 5-10 under 35 U.S.C. §102 as being anticipated by A New Self-Routing Multicast Network , IEEE December 1999, hereafter Yang et al.. Applicants respectfully traverse the rejection.

**Claims 2, 3 and 5-6**

Claims 2, 3 and 5-6 each recite, *inter alia,* "A method (apparatus) for routing packets through a switching network comprising: ... coding (an encoder for) each one of the in-band control signals of the packets into a plurality of bits based on a predetermined coding scheme , and generating (a generator for), with reference to the coding scheme, the output bits of the local output packets at each one of the switching elements based on a subset of the bits in the corresponding one of the in-band control signals ..."

In rejecting claims 2, 3 and 5-6, the Examiner states that Yang et al. discloses "generating with reference to a coding scheme (see Table 1) the output bits of the local output packets at each one of the switching elements based on a subset of the bits in the corresponding one of the in-band control signals for each one of the switching elements to route the local input packets arriving at the corresponding switching element (See page 1310, column 1, lines 3-20)."

Accordingly, one must conclude that the Examiner is relying on the encoding scheme shown in Table 1 as being identical to the "coding scheme" recited in claims 2, 3, 5 and 6 for rejecting claims 2, 3, 5 and 6 under 35 U.S.C. §102.

**Claims 7-10**

Claims 7-10 each recite, *inter alia*, "A method for routing packets through a switching network comprising: ... the coding scheme includes coding the bits such that the first bit of the code for the in-band control signal corresponding to a 0-bound packet type is different from the first bit of the code for the in-band control signal corresponding to a 1-bound packet type."

In rejecting claims 7-10, the Examiner states that Yang et al. discloses a coding algorithm that "includes coding the bits such that the first bit of the code of the in-band control signal corresponding to the 0 bound packet type (See case 1 on page 1300) is

different from the first bit of the code for the in-band control signal corresponding to a 1-bound packet type (See case 2 on page 1300)."

Accordingly, one must conclude that the Examiner is relying on the coding described by cases 1 and 2 on page 1300 as being identical to the claimed "coding scheme" for rejecting claims 7-10 under 35 U.S.C. §102.

**Amended claims 2-3 and 5-6**

Each of amended claims 2-3 and 5-6 has been amended with the subject matter of claims 7-10 and recites in relevant part "A method (apparatus) for routing packets through a switching network comprising: ... coding (an encoder for) each one of the in-band control signals of the packets into a plurality of bits based on a predetermined coding scheme ... coding the bits such that the first bit of the code for the in-band control signal corresponding to a 0-bound packet type is different from the first bit of the code for the in-band control signal corresponding to a 1-bound packet type."

At page 1306, section 5.2, Yang et al. clearly teach that a reverse banyan network (RBN) operating in accordance with Theorem 1 cannot be applied to multicast assignments unless each tag value is represented by three bits. Further, Yang et al. teach the encoding scheme for generating the tag bits in Table 1.

Applicants traverse the rejections of claims 2-3 and 5-6, as amended, based on the following:

1. The Examiner in rejecting unamended claims 2-3 and 5-6 under 35 U.S.C. §102 infers that the claimed "coding scheme" is identical to the coding of the tag values shown in Table 1, while in rejecting unamended claims 7-10 under 35 U.S.C. §102 , the Examiner infers that the claimed "coding scheme" is identical to the coding used for the destination addresses. These encoding schemes are totally different, the coding scheme for the tag values being three bits per symbol and the coding scheme for the destination addresses being1 bit per symbol .

*The same terms appearing in different portions of the claims should be given the same meaning unless it is clear from the specification*

*and prosecution history that the terms have different meanings at different portions of the claims."* Fin Control Sys. Pty., Ltd. v. OAM, Inc., *265 F.3d 1311, 1318, 60 USPQ2d 1203, (Fed. Cir. 2001);* see also, e.g., Phillips, *415 F.3d at 1314;* Rexnord Corp. v. Laitram Corp., *274 F.3d 1336, 1342, 60 USPQ2d 1851 (Fed. Cir. 2001).*

The coding disclosed in Table 1 for coding the tag values is completely different than the coding disclosed for coding the destination addresses. Thus, because the coding scheme on which the Examiner relies for claims 2-3, and 5-6 and is completely different from the coding scheme relied on for claims 7-10, the term "coding scheme" acquires two different meanings. Because the Examiner has not justified why the term "coding scheme" can be given two different meanings based on the specification or the prosecution history, <u>the rejections of claims 2-3 and 5-6 and 7-10 is improper</u>.

2. As discussed above, Yang et al. at sections 5.2, page 1306, col. 2, and section 7.2, page 1311, column 2 clearly states that the three bits per symbol coding of a routing tag shown in Table 1 is required for the network to be capable of multitasking.

Amended claims 2, 3, 5 and 6 each recite that the first bit of the in-band control signal corresponding to a 0 bound packet type is different than the first bit of the in-band control signal corresponding to a 1 bound packet type. Table 1 clearly shows that the tag value of the in-band control signal for a 0 bound packet is 000 and the tag value of the in-band control signal for a 1 bound packet is 001. <u>Thus, in contrast to amended claims 2, 3 5 and 6, Yang et al., teaches a coding scheme in which the first bit of the 0 bound packet type is identical to a 1 bound packet type.</u>

Yang et al. does not teach or suggest that the first bit of the in-band control signal corresponding to a 0 bound packet type is different than the first bit of the in-band control signal corresponding to a 1 bound packet type, as recited by amended claims 2, 3 and 5-6. Accordingly, because Yang et al. does not teach all the elements of any of amended claims 2, 3, 5 and 6, Applicants respectfully request reconsideration and withdrawal of the §102 rejection of claims 2, 3, 5 and 6.

**Conclusion**

Insofar as the Examiner's objections and rejections have been fully addressed, the instant application, including claims 2-3 and 5-6, is in condition for allowance and Notice of Allowability of claims 2-3 and 5-6 is therefore earnestly solicited.

Respectfully submitted,

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